Kramer Electronics, Ltd.

USER MANUAL

Model:

906
6.6W Per Channel Stereo Audio Amplifier

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 1,000-plus different models now appear in 11 groups[1] that are clearly defined by function.

Thank you for purchasing the Kramer MegaTOOLS® **906** *6.6W Per Channel Stereo Audio Amplifier*, which is ideal for:

- Presentation rooms and multimedia applications for quick, local audio amplification
- Personal audio listening (for example, a PC and portable CD player)

The package includes the following items:

- **906** *6.6W Per Channel Stereo Audio Amplifier*
- Kramer **RC-IR3** Infrared Remote Control Transmitter (including the required battery and a separate user manual)
- Power supply (12V DC)
- This user manual[2]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables[3]

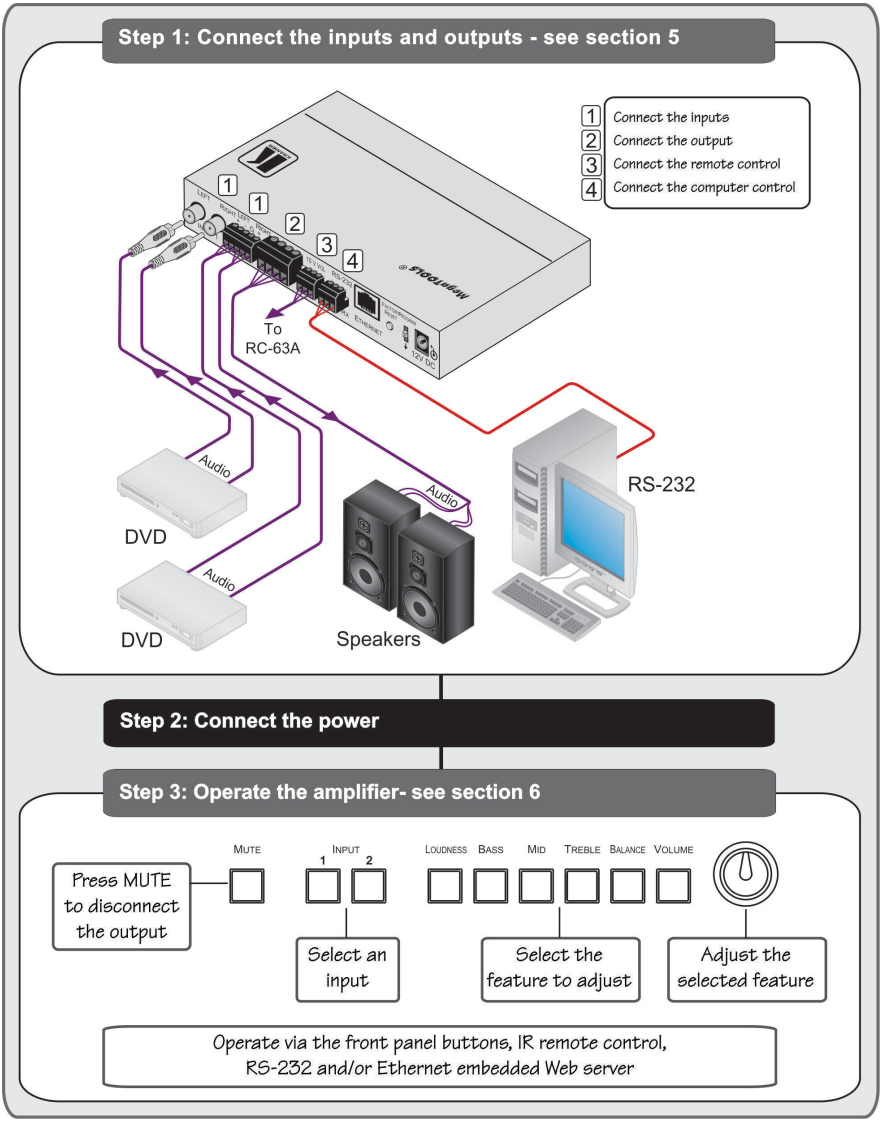
1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 Download up-to-date Kramer user manuals from our Web site at http://www.kramerelectronics.com

3 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.



3 Overview

The Kramer **906** is a high-performance audio amplifier for line-level stereo audio signals. It accepts either a stereo audio signal on RCA connectors or a balanced stereo audio signal on a terminal block connector. It delivers a speaker output of 6.6W RMS per channel into 8Ω loads on a 4-pin terminal block connector. The **906** features:

- Two input selector buttons and a mute button
- One gain knob for adjusting the audio output levels for loudness, bass, middle, treble, balance and the volume
- A USB connector for firmware upgrade
- RS-232 and Ethernet ports
- A 10V control port for adjusting the audio gain via an external connector[1]

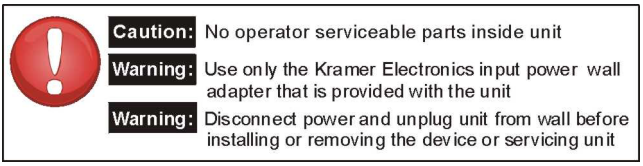
The **906** can be controlled:

- Directly, via the front panel push buttons and adjustment knob
- Via an external 10V controller (for volume)
- By RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller
- Via the Ethernet using the embedded Web server
- Remotely, from the infrared remote control transmitter

The **906** is housed in a Kramer MegaTOOLS™ enclosure and is fed by a 12V DC power supply.

To achieve the best performance:

- Use only good quality connection cables[2] to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your Kramer **906** away from moisture, excessive sunlight and dust


Caution: No operator serviceable parts inside unit
Warning: Use only the Kramer Electronics input power wall adapter that is provided with the unit
Warning: Disconnect power and unplug unit from wall before installing or removing the device or servicing unit

1 For example, the Kramer RC-63A

2 Available from Kramer Electronics on our Web site at http://www.kramerelectronics.com

4 Your 906 Amplifier

Figure 1 and Table 1 define the **906**.

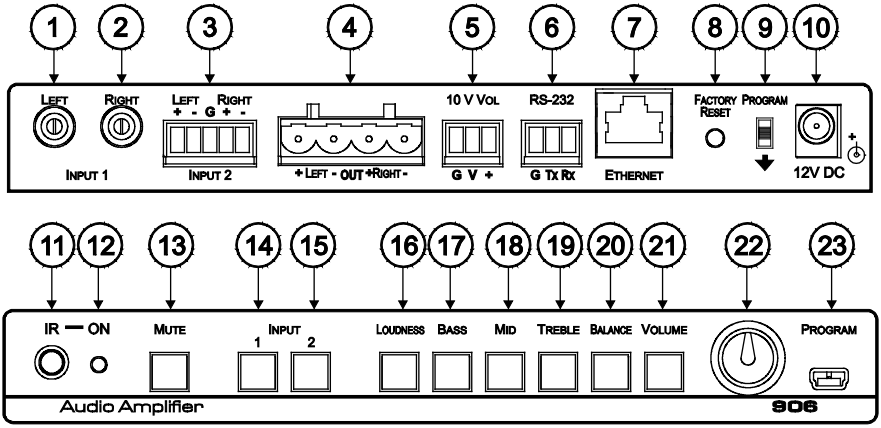


Figure 1: 906 Amplifier

Table 1: 906 Amplifier Functions

#	Feature		Function
1	*INPUT 1 L* RCA Connector		Connect to the left unbalanced stereo analog audio source 1
2	*INPUT 1 R* RCA Connector		Connect to the right unbalanced stereo analog audio source 1
3	*INPUT 2* Terminal Block Connector		Connect to the balanced stereo audio source 2
4	*OUT* Terminal Block Connector		Connect to a balanced stereo acceptor (speakers)
5	*10V VOL* Terminal Block Connector		Connect to a controller[1] to adjust the volume via the controller
6	*RS-232 Tx Rx G* Terminal Block Connector		Control connector for RS-232
7	*ETHERNET* Port		Connects to your LAN[2]
8	*FACTORY RESET* Button		Press to reset to the factory default state
9	*PROGRAM* Switch		For factory use only
10	*12V DC Connector*		+12V DC for powering the unit
11	*IR IN* Receiver		Accepts IR remote commands
12	*ON* LED		Illuminates green when receiving power, flashes when receiving IR commands
13	*MUTE* Button		Press to disable/enable the audio output. The button illuminates when the audio output is disabled
14	*INPUT SELECTOR* Buttons	*1*	Press to select the input 1 audio source
15		*2*	Press to select the input 2 audio source
16	*LOUDNESS* Adjustment Button		Press to select the loudness adjustment, adjust with the Level Knob
17	*BASS* Adjustment Button		Press to select the bass adjustment, adjust with the Level Knob

1 For example, the Kramer RC-63A

2 Local Area Network (that is, computers sharing a common communications line or wireless link, which often share a server within a defined geographic area)

#	Feature	Function
18	*MID* Adjustment Button	Press to select the mid range adjustment, adjust with the Level Knob
19	*TREBLE* Adjustment Button	Press to select the treble adjustment, adjust with the Level Knob
20	*BALANCE* Adjustment Button	Press to select the balance between right and left speakers, adjust with the Level Knob
21	*VOLUME* Adjustment Button	Press to select the volume adjustment, adjust with the Level Knob. Press and hold to disable local volume control and enable remote volume control. Press and hold again to activate local volume control (see section 6.1)
22	Adjustment Potentiometer Knob	Turn to raise or lower the selected audio feature
23	*PROGRAM* USB Connector	For factory use only

5 Connecting the 906 Amplifier

To connect the **906**, as illustrated in the example in Figure 2, do the following:

1. Connect an unbalanced stereo audio source (for example, the unbalanced stereo audio output of a DVD player) to the L and R INPUT 1 RCA connectors.
2. Connect a balanced stereo audio source (for example, the balanced stereo audio output of a DVD player) to the INPUT 2 terminal block connector.
3. Connect the OUTPUT terminal block to a pair of loudspeakers: Connect the "L+" and the "L-" terminal block connectors to the left loudspeaker, and the "R+" and the "R-" terminal block connectors to the right loudspeaker. **Do not ground the loudspeakers**.
4. Connect the 12V DC power adapter to the power socket and connect the adapter to the mains electricity (not shown in Figure 2).
5. If required connect:
   - The 10V CONTROL terminal block connector to an external controller[1] (see section 5.1)
   - The RS-232 port to a PC and/or serial controller (see section 5.2)
   - The Ethernet port to a PC or a network hub or router (see section 5.3)

1 For example, the Kramer RC-63A

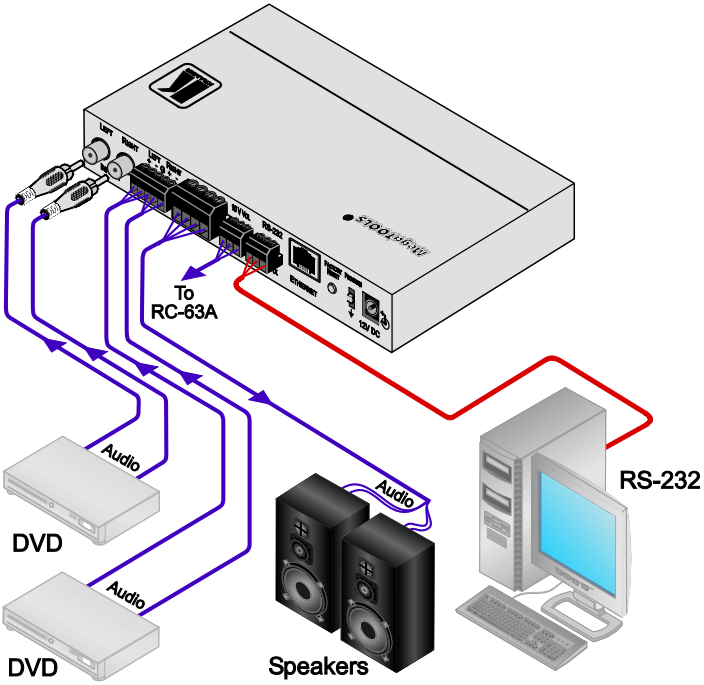


Figure 2: Connecting the 906 Audio Amplifier

5.1 Connect the 10V CONTROL Port to an External Controller

You can connect the **906** 10V CONTROL terminal block connector to a controller (for example, the Kramer **RC-63A**) as illustrated in Figure 3:

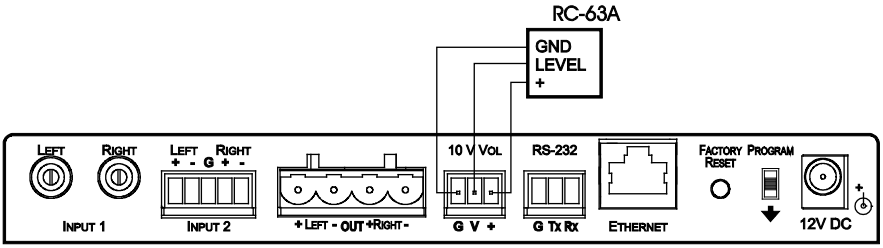


Figure 3: Connecting the 10V CONTROL Terminal Block Connector

5.2 Connecting a PC

You can connect a PC (or other controller) to the **906** via the RS-232 terminal block connector.

To connect a PC to a **906** unit, connect the RS-232 terminal block connector on the **906** unit to the RS-232 9-pin D-sub port on your PC, see Figure 4

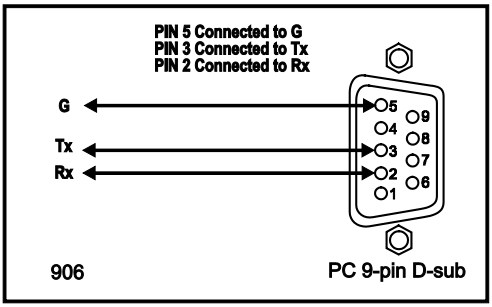


Figure 4: Connecting to a PC

5.3 Connecting the 906 via the Ethernet Port

To connect the **906** via the Ethernet port, do the following:

- When connecting to the Ethernet port on a network hub or network router, use a straight-through cable with RJ-45 connectors
- When connecting to the Ethernet port of a PC, use a crossover cable with RJ-45 connectors

If you are connecting the **906** directly to your computer (not through the network) you may need to reconfigure the PC network settings.

To reconfigure the PC network settings:

1. Navigate to *Start* > *Settings* > *Network Connections*.
2. Click on the appropriate *Local Area Connection*.
3. Right-click the *Local Area Connection* and click *Properties*.
   The Local Area Properties Window appears:

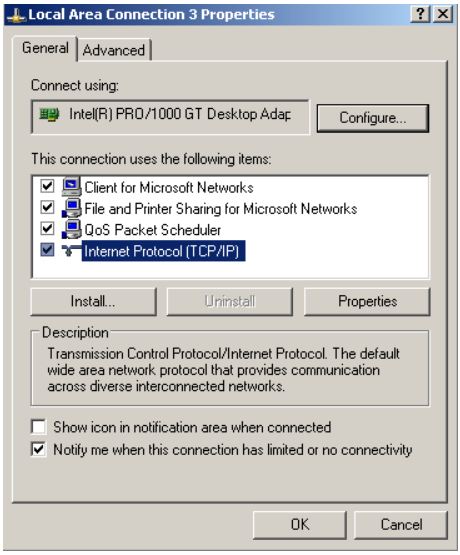


Figure 5: Local Area Properties Window

4. Select *Internet Protocol (TCP/IP)* and click *Properties*.
   The Internet Protocol (TCP/IP) Properties Window appears:

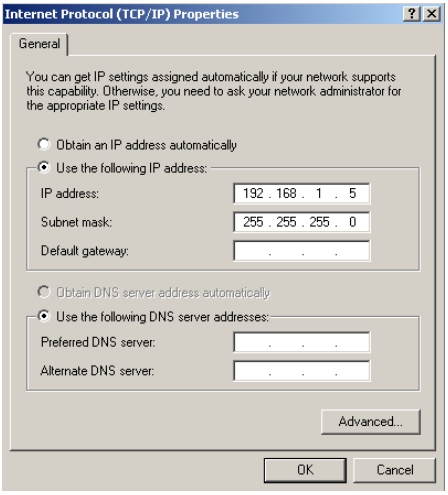

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 1 . 5
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Figure 6: Internet Protocol (TCP/IP) Properties Window

5. Click *Use the following IP address* and enter the IP address and Subnet mask shown above. Click *OK* and *OK* to close both windows and save the settings.

6 Operating the 906

You can operate your **906** using:

- The front panel buttons (see section 6.1)
- PC, touch screen system, or other serial controller via RS-232 serial commands (see section 6.2)
- The Ethernet via the embedded Web server (see section 6.3)

6.1 Using the Front Panel Buttons

The front panel buttons let you:

- Select an input, by pressing the INPUT 1 or the INPUT 2 button
- Adjust the sound

To adjust the sound of the output signal:

1. Press the sound component that you want to adjust (LOUD, BASS, MID, TREBLE, BAL or VOLUME). The button illuminates.
2. Turn the adjustment knob to adjust the value.

Note: To enable remote volume control via the 10V VOL connector (using for example, the Kramer **RC-63A**), you must disable the local digital volume control by pressing and holding the VOLUME button on the front panel for several seconds. The LED flashes to indicate that remote control is enabled. In this mode, volume control via software ("Set simple audio volume" P3000 command, see section 9.6) is disabled. To disable remote control, press and hold the VOLUME button and the LED lights solid.

6.2 Using Serial Commands

To operate your device using serial commands, you need to install Kramer's control software[1].

For an explanation of all control commands, see section 9.

6.3 Using the Embedded Web Server

You can remotely operate the **906** using a Web browser via the Ethernet connection (see section 5.3). To be able to do so, you must use a supported Web browser; Microsoft (V6.0 and higher), Chrome or Firefox (V3.0 and higher).

1 Download control software from our Web site at http://www.kramerelectronics.com

To check that Java is installed correctly and running, browse to: http://www.java.com/en/download/help/testvm.xml

This page runs a test and displays a Java success (see Figure 7) or failure message.

Figure 7: Java Test Page Success Message

If you do not see the success message, follow the instructions on the page to:

- Load and enable Java
- Enable Javascript in your browser

Make sure that your PC is connected via the Ethernet connection to the **906** (see section 5.3) and do the following:

1. Open your Internet browser.
2. Enter the unit's IP number[1] or name in the Address bar of your browser. If you are using DHCP, you must enter the name.

Figure 8: Entering the IP Number in the Address Bar

The following window appears:

1 The default IP number is 192.168.1.39, and may be changed by the system integrator

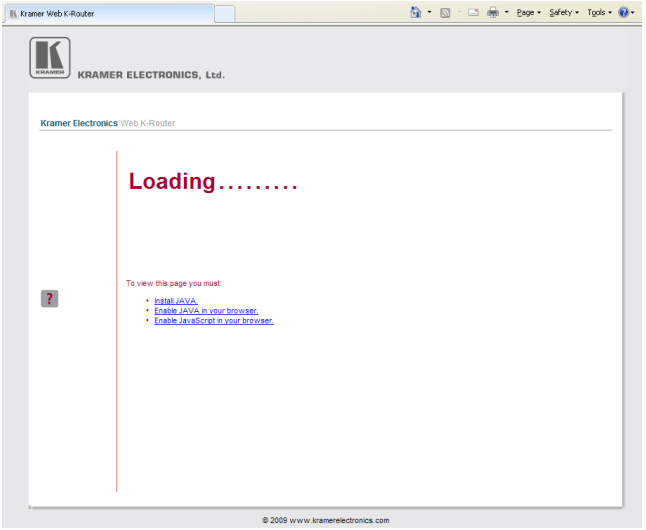


Figure 9: Loading the Embedded Web Server

3. Check that Java and JavaScript is enabled in your browser.
   The following window appears:

Warning - Security
The application's digital signature cannot be verified.
Do you want to run the application?
Name: K_Applet
Publisher: Kramer Electronics
From: http://192.168.1.39
Always trust content from this publisher.
Run
Cancel
The digital signature cannot be verified by a trusted source. Only run if you trust the origin of the application.
More Information...

Figure 10: First Time Security Warning

4. Click Run.
   The **906** Control Window opens (see Figure 11):

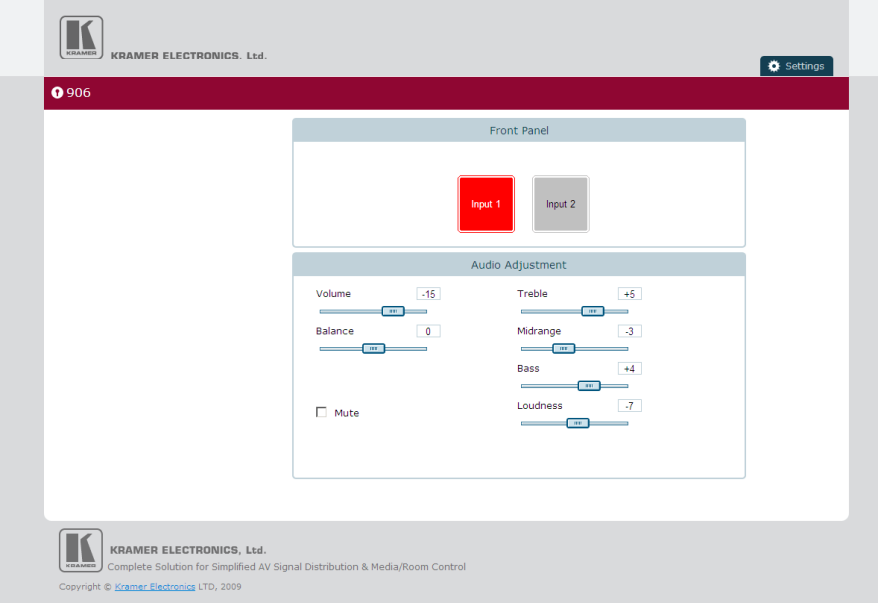


Figure 11: The 906 Control Window

5. To choose the desired input, click on *Input 1* or *Input 2* (see Figure 12). Each input has its own set of audio adjustments.
6. To adjust each function, click and hold each slider and drag to the right to increase or to the left to decrease the shown value.
7. To mute the output, check the Mute box.

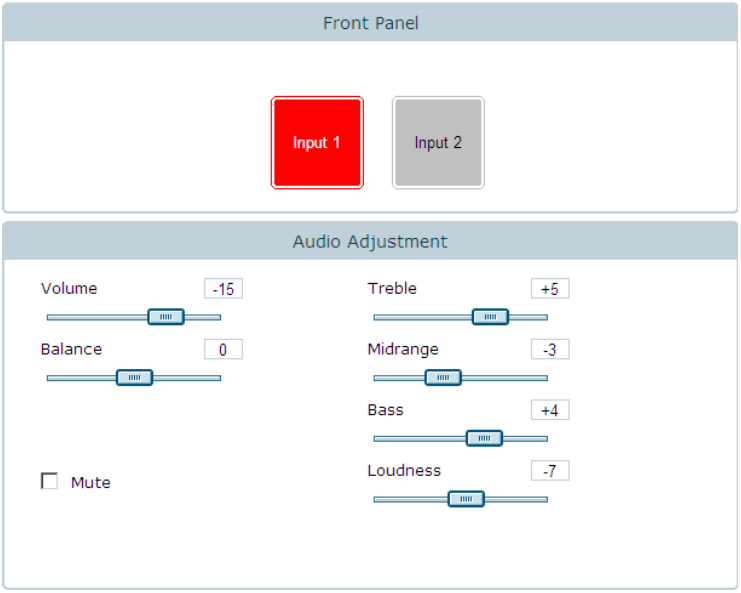


Figure 12: Control Settings

8. To change the Ethernet settings, click the *Settings* tab at the top of the Control Window. The Ethernet settings display (see Figure 13):

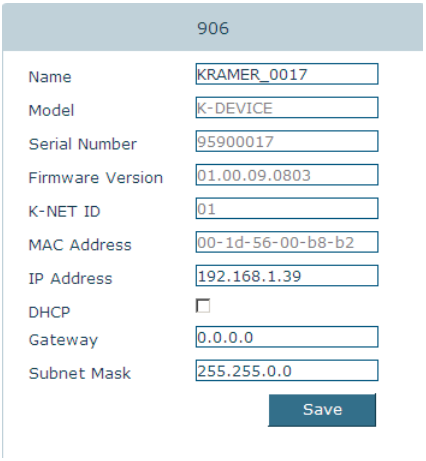


Figure 13: Ethernet Settings

9. Make any necessary changes and click *Save* to save the settings.
10. To return to the Control Window, click *906* under the Kramer logo.

6.4 Using the RC-IR3 Infrared Remote Controller

You can use the **RC-IR3** remote controller to make some[1] of the adjustments that are made using the front panel buttons:

- To choose an input, press button 1 or 2
- To toggle muting, press the OFF button
- To increase the volume, press + (►)
- To decrease the volume, press – (◄)

6.5 Updating the 906 Firmware

The **906** functions by means of a device microcontroller that runs firmware located in FLASH memory.

If required, you can download[2] and upgrade to the latest version of firmware[3].

7 Default Communication Parameters

Table 2 lists the communication parameters as used in Kramer Electronics products.

Table 2: Default Communication Parameters

RS-232	
Protocol 3000 (Default)	
Baud Rate:	115,200
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	ASCII
Ethernet Factory Default Values	
IP Address: 192.168.1.39 Mask: 255.255.255.0 Gateway: 192.168.1.1	Power cycle the unit while pressing the Factory Reset button, located on the rear panel of the unit.
TCP Port #: 5000	
UDP Port #: 50000	

1 Loudness, bass, mid, treble and balance adjustments are not adjustable using the IR remote

2 From the Kramer Web site www.kramerelectronics.com

3 The firmware is installed using the P3K software that is also available from the Kramer Web site

8 Technical Specifications

906 technical specifications are shown in Table 3:

Table 3: 906 Technical Specifications[1]

INPUTS:	1 unbalanced stereo audio input on RCA connectors; 1 balanced stereo audio input on a 5-pin terminal block connector
OUTPUTS:	1 speaker stereo audio output on a 4-pin terminal block connector
INPUT SENSITIVITY:	224mVpp
OUTPUT POWER:	6.6W per channel into 8Ω; 11W per channel into 4Ω
MAX. VOLTAGE GAIN:	65.6x, 36.3dB
OUTPUT MUSIC POWER:	22W per channel into 8Ω; 28W per channel into 4Ω
BANDWIDTH (-3dB):	32.5kHz
S/N RATIO:	67.5dB @1kHz
CROSSTALK:	-55.6dB @1kHz
CONTROLS:	Volume: < -37dB to 35.6dB; balance: < -20dB to 0dB; treble: -5.3dB to 10.9dB @10kHz; mid: -7.8dB to 13.2dB @1kHz; bass: -4.1dB to 15.1dB @100Hz; RS-232 on a terminal block connector; Ethernet; USB for upgrading firmware
ADDITIONAL CONTROLS:	Input selector, mute, external potentiometer, remote by contact closure, infrared remote
COUPLING:	Input: AC, output: DC
AUDIO THD + NOISE:	3.4% @1kHz
AUDIO 2nd HARMONIC:	0.3% @1kHz
AMPLIFIER TYPE:	Class D
POWER SOURCE:	12V DC 1.2A (8Ω load), 1.7A (4Ω load)
DIMENSIONS	18.8cm x 11.4cm x 2.4cm (7.4" x 4.5" x 0.94") W, D, H
WEIGHT:	0.6kg (1.32lbs)
ACCESSORIES:	Power supply, RC-IR3 remote controller
OPTIONS:	RK-T2B 19” rack adapter

1 Specifications are subject to change without notice

9 906 Commands in Protocol 3000

This RS-232/RS-485 communication protocol lets you control the machine from any standard terminal software (for example, Windows® HyperTerminal Application) and uses a data rate of 115200 baud, with no parity, 8 data bits, and 1 stop bit.

This section describes all commands sent to the **906**. For an explanation of the syntax and use of Protocol 3000, see section 9.10.

9.1 Operating Commands

Following are the specific commands that the room controller (RC device) sends to the **906** to operate the external devices.

9.2 Help Commands

Command	Syntax	Response
Protocol handshaking	#CR	~OK CRLF

9.3 Device Initiated Messages

Command	Syntax
Start message	Kramer Electronics LTD. , Device Model Version Software Version
Switcher actions:	
Audio channel has switched (breakaway mode)	AUD IN>OUT

9.4 Result and Error Codes

	Syntax
Command ran successfully, no error.	COMMAND PARAMETERS OK
Protocol Errors:	
Syntax error	ERR001
Command not available for this device	ERR002
Parameter is out of range	ERR003
Unauthorized access (command run without the matching login).	ERR004

9.5 Basic Routing Commands

Command	Syntax	Response
Switch audio only	AUD IN>OUT, IN>OUT, … Short form: A IN>OUT, IN>OUT, …	AUD IN>OUT, IN>OUT, …RESULT
Switch audio only	AUD IN>OUT, IN>OUT, … Short form: A IN>OUT, IN>OUT, …	AUD IN>OUT, IN>OUT, …RESULT
Read audio connection	AUD? OUT Short form: A? OUT AUD? *	AUD IN>OUT AUD IN>1, IN>2, …

Parameter Description:

IN = Input number or '0' to disconnect output.

'>' = Connection character between in and out parameters.

OUT = Output number or '*' for all outputs.

9.6 Audio Parameter Commands

Command	Syntax	Response
Set simple audio volume[1]	VOLUME VOLUME Short form: VOL VOLUME	VOLUME VOLUME RESULT
Read simple audio level[1]	VOLUME? Short form: VOL?	VOLUME VOLUME
Set audio level in specific amplifier stage.	AUD-LVL STAGE, CHANNEL, VOLUME Short form: ADL STAGE, CHANNEL, VOLUME	AUD-LVL STAGE, CHANNEL, VOLUME RESULT
Read audio volume level	AUD-LVL? STAGE, CHANNEL Short form: ADL? STAGE	AUD-LVL STAGE, CHANNEL, VOLUME
Advanced commands for controlling each stage of audio amplification:		
Set audio bass level	BASS CHANNEL, BASS Short form: ADB CHANNEL, BASS	BASS CHANNEL, BASS RESULT
Read audio bass level	BASS? CHANNEL Short form: ADB? CHANNEL	BASS CHANNEL, BASS
Set audio treble level	TREBLE CHANNEL,TREBLE Short form: ADT CHANNEL,TREBLE	TREBLE CHANNEL, TREBLE RESULT
Read audio treble	TREBLE? CHANNEL Short form: ADT? CHANNEL	TREBLE CHANNEL, TREBLE
Set audio midrange	MIDRANGE CHANNEL, MID_RANGE Short form: ADM CHANNEL, MID_RANGE	MIDRANGE CHANNEL, MID_RANGE RESULT
Read audio midrange	MIDRANGE? CHANNEL Short form: ADM? CHANNEL	MIDRANGE CHANNEL, MID_RANGE
Set audio loudness	LOUDNESS CHANNEL, LOUDNESS Short form: ADS CHANNEL, LOUDNESS	LOUDNESS CHANNEL, LOUDNESS RESULT
Read audio loudness	LOUDNESS? CHANNEL Short form: ADS? CHANNEL	LOUDNESS CHANNEL, LOUDNESS
Mute audio	MUTE MUTE-MODE	MUTE MUTE-MODE RESULT

1 From -80 (mute) to 15 (-80dB to +15dB)

Command	Syntax	Response
Read audio mute state	MUTE?	MUTE MUTE-MODE
Set stereo mode	STEREO STEREO-MODE	STEREO STEREO-MODE RESULT
Read stereo mode	STEREO?	STEREO STEREO-MODE
Set balance mode	BALANCE OUT-CHANNEL, BALANCE-LEVEL	BALANCE OUT-CHANNEL, BALANCE-LEVEL RESULT
Read balance mode	BALANCE? OUT-CHANNEL	BALANCE OUT-CHANNEL, BALANCE-LEVEL

Parameter Description:

STAGE = 'IN, 'OUT'

or

Numeric value of present audio processing stage. For example: '0' for input level, '1' for pre-amplifier, '2' for amplifier (OUT) etc.

CHANNEL = Input or Output #

VOLUME / BASS / TREBLE / MID_RANGE = Audio parameter in Kramer units, minus sign precedes negative values.

++ increase current value,

-- decrease current value.

9.7 Identification Commands

Command	Syntax	Response
Protocol handshaking	#CR	~OK CRLF
Read device model	MODEL?	MODEL MACHINE_MODEL
Read device serial number	SN?	SN SERIAL_NUMBER
Read device firmware version	VERSION?	VERSION MAJOR .MINOR .BUILD .REVISION
Set machine name	NAME MACHINE_NAME	NAME MACHINE_NAME RESULT
Read machine name	NAME?	NAME MACHINE_NAME
Reset machine name to factory default*	NAME-RST	NAME-RST MACHINE_FACTORY_NAME RESULT

***Note**: The machine name is not the same as the model name. The machine name is used to identify a specific machine or a network in use (with DNS feature on).

MACHINE_NAME = Up to 14 alphameric chars.

* **Machine factory name =** Model name + last 4 digits from serial number.

Set machine ID number	MACH-NUM MACHINE_NUMBER	MACH-NUM OLD_MACHINE_NUMBER ,NEW_MACHINE_NUMBER RESULT

* A response is sent after the machine number was changed. The response with the header is:

NEW_MACHINE_NUMBER @MACH-NUM OLD_MACHINE_NUMBER ,NEW_MACHINE_NUMBER OK

9.8 Network Setting Commands

Command	Syntax	Response
Set IP address	NET-IP IP_ADDRESS Short form: NTIP	NET-IP IP_ADDRESS RESULT
Read IP address	NET-IP? Short form: NTIP?	NET-IP IP_ADDRESS
Read MAC address	NET-MAC? Short form: NTMC	NET-MAC MAC_ADDRESS
Set subnet mask	NET-MASK SUBNET_MASK Short form: NTMSK	NET-MASK SUBNET_MASK RESULT
Read subnet mask	NET-MASK? Short form: NTMSK?	NET-MASK SUBNET_MASK
Set gateway address	NET-GATE GATEWAY_ADDRESS Short form: NTGT	NET-GATE GATEWAY_ADDRESS RESULT
Read subnet mask	NET-GATE? Short form: NTGT?	NET-GATE GATEWAY_ADDRESS
Set DHCP mode	NET-DHCP DHCP_MODE Short form: NTDH	NET-DHCP DHCP_MODE RESULT
Read subnet mask	NET-DHCP? Short form: NTDH?	NET-DHCP DHCP_MODE

DHCP_MODE =
'0' – Don't use DHCP (Use IP set by factory or IP set command).
'1' – Try to use DHCP, if unavailable use IP as above.

Change protocol Ethernet port	ETH-PORT PROTOCOL , PORT Short form: ETHP	ETH-PORT PROTOCOL , PORT RESULT
Read protocol Ethernet port	ETH-PORT? PROTOCOL Short form: ETHP?	ETH-PORT PROTOCOL , PORT

PROTOCOL = TCP/UDP (transport layer protocol)
PORT = Ethernet port that accepts Protocol 3000 commands
1-65535 = User defined port
0 - Reset port to factory default (50000 for UDP, 5000 for TCP)

9.9 Machine Information Commands

Command	Syntax	Response
Set device time and date	TIME DATE_TIME	TIME DATE_TIME RESULT
Read device time and date	TIME?	TIME? DATE_TIME

Note: Time setting commands require administrator authorization.

Read in/out count	INFO-IO?	INFO-IO: IN INPUTS_COUNT, OUT OUTPUTS_COUNT
Read max preset count	INFO-PRST?	INFO-PRST: VID PRESET_VIDEO_COUNT, AUD PRESET_AUDIO_COUNT
Execute firmware upgrade*	UPGRADE	UPGRADE OK

Firmware usually uploads to a device via a command like LDFW. The device may need to be reset to complete the process.

Command	Syntax	Response
Reset to factory default configuration	FACTORY	FACTORY RESULT
Set model name	FCT-MODEL FACTORY_PASSWORD MODEL_NAME	FCT-MODEL MAC_ADDRESS RESULT

*If implemented by hard coding, protocol command is unnecessary

Set MAC address	FCT-MAC FACTORY_PASSWORD MAC_ADDRESS	FCT-MAC MAC_ADDRESS RESULT
Set SN #	FCT-SN FACTORY_PASSWORD SN#	FCT-SN SN# RESULT

* Machine factory settings commands are not for public knowledge. Reference is only for internal implementation

9.10 Protocol 3000 Syntax

Protocol 3000 is used to control the **906** via an RS-232 connection using a PC, touch screen, other serial controller or RC type controller.

9.10.1 Host Message Format

Start	Address (optional)	Body	Delimiter
#	*Destination_id*@	**Message**	CR

9.10.1.1 Simple Command

Command string with only one command without addressing:

Start	Body	Delimiter
#	**Command** SP *Parameter_1,Parameter_2,…*	CR

9.10.1.2 Command String

Formal syntax with commands concatenation and addressing:

Start	Address	Body	Delimiter
#	*Destination_id*@	**Command_1** *Parameter1_1,Parameter1_2,…*| **Command_2** *Parameter2_1,Parameter2_2,…*| **Command_3** *Parameter3_1,Parameter3_2,…*|…	CR

9.10.1.3 Device Message Format

Start	Address (optional)	Body	delimiter
~	*Sender_id*@	**Message**	CR LF

9.10.1.4 Device Long Response

Echoing command:

Start	Address (optional)	Body	Delimiter
~	*Sender_id*@	**Command** SP **[***Param1 ,Param2 …***] result**	CR LF

CR = Carriage return (ASCII 13 = 0x0D)
LF = Line feed (ASCII 10 = 0x0A)
SP = Space (ASCII 32 = 0x20)

9.10.2 Command Terms

Command
A sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').
Command and parameters must be separated by at least one space.

Parameters
A sequence of alphameric ASCII characters ('0'-'9','A'-'Z','a'-'z' and some special characters for specific commands). Parameters are separated by commas.

Message string
Every command entered as part of a message string begins with a **message starting character** and ends with a **message closing character**.
Note: A string can contain more than one command. Commands are separated by a pipe ('|') character.

Message starting character
'#' – For host command/query
'~' – For machine response

Device address (Optional, for K-NET)
K-NET Device ID followed by '@'

Query sign
'?' follows some commands to define a query request.

All outputs sign
'*' defines all outputs.

Message closing character
CR – For host messages; carriage return (ASCII 13)
CRLF – For machine messages; carriage return (ASCII 13) + line-feed (ASCII 10)

Command chain separator character
When a message string contains more then one command, a pipe ('|') character separates each command.

Spaces between parameters or command terms are ignored.

9.10.3 Entering Commands

You can directly enter all commands using a terminal with ASCII communications software, such as HyperTerminal, Hercules, etc. Connect the terminal to the serial, Ethernet, or USB port on the Kramer device. To enter **CR** , press the Enter key.
(**LF** is also sent but is ignored by command parser).

For commands sent from some non-Kramer controllers like Crestron, some characters require special coding (such as, /X##). Refer to the controller manual.

9.10.4 Command Forms

Some commands have short name syntax in addition to long name syntax to allow faster typing. The response is always in long syntax.

9.10.5 Command Chaining

Multiple commands can be chained in the same string. Each command is delimited by a pipe character ('|'). When chaining commands, enter the **message starting character** and the **message closing character** only once, at the beginning of the string and at the end.

Commands in the string do not execute until the closing character is entered.

A separate response is sent for every command in the chain.

9.10.6 Maximum String Length

64 characters

LIMITED WARRANTY

We warrant this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by us or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.
3. Damage, deterioration or malfunction resulting from:
   i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   ii) Product modification, or failure to follow instructions supplied with the product
   iii) Repair or attempted repair by anyone not authorized by Kramer
   iv) Any shipment of the product (claims must be presented to the carrier)
   v) Removal or installation of the product
   vi) Any other cause, which does not relate to a product defect
   vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC* Rules and Regulations: Part 15: “Radio frequency devices Subpart B Unintentional radiators”

CAUTION!

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied DC power supply to feed power to the machine.
- Please use recommended interconnection cables to connect the machine to other components.

* FCC and CE approved using STP cable (for twisted pair products)

For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com where updates to this user manual may be found.
We welcome your questions, comments and feedback.

Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

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